

Though conceived as no more than a common-sense device intended to help Tube travellers to get on at the right station, make the right connections and get off at the right destination, the London Underground Diagram quickly became more than that. Over the last 60 years many newcomers to London, whether as visitors or residents, have pounced on the Diagram as on a magic guide to a hitherto totally bewildering city. Before them was an orderly simulacrum for a disorderly, disjointed accumulation of urban villages, only barely discernible from one another on the ground, yet possessed with all the pride and exclusiveness of true communities: Camden Town, Hammersmith, Lambeth, Hampstead, Kensington, Acton, Barking, Aldgate, Bayswater... What matter if Chelsea was nowhere to be seen in its orderly array, nor Bloomsbury, nor Mayfair, nor Bermondsey? They'd be fitted into the newcomer's mental map sooner or later, once the basic linkage had been absorbed and its litany learned; for example, that Leicester Square was 'below' Tottenham Court Road, Oxford Circus to its 'left', Goodge Street 'above' it and Holborn to its 'right'.

Critics protested that the Diagram was an inaccurate and misleading guide to London's complex configuration; some were even suspicious of its real purpose, hinting that it might be part of a devious plot to fool a gullible public into thinking the remoter stations on the Underground were more accessible than in fact they were\*.

But the public knew better on both grounds. They were not under any illusion about the city's real nature; after all, they had walked, even if briefly, along its irregular streets unsure whether they were going east, or north, or possibly west. They knew very well that London was not a grid city, like New York, or a radial city, like Paris, but one to which no easy handle could be applied. And even the most experienced of them could not tell you where its centre was:

Trafalgar Square? Piccadilly Circus? Parliament Square? Marble Arch? Hyde Park Corner? Saint Pauls? The only possible answer was, all of these and none of these. How could a conglomeration cobbled together from the space between the two historic entities, the Cities of London and Westminster, bring itself to choose one indisputable focal point?

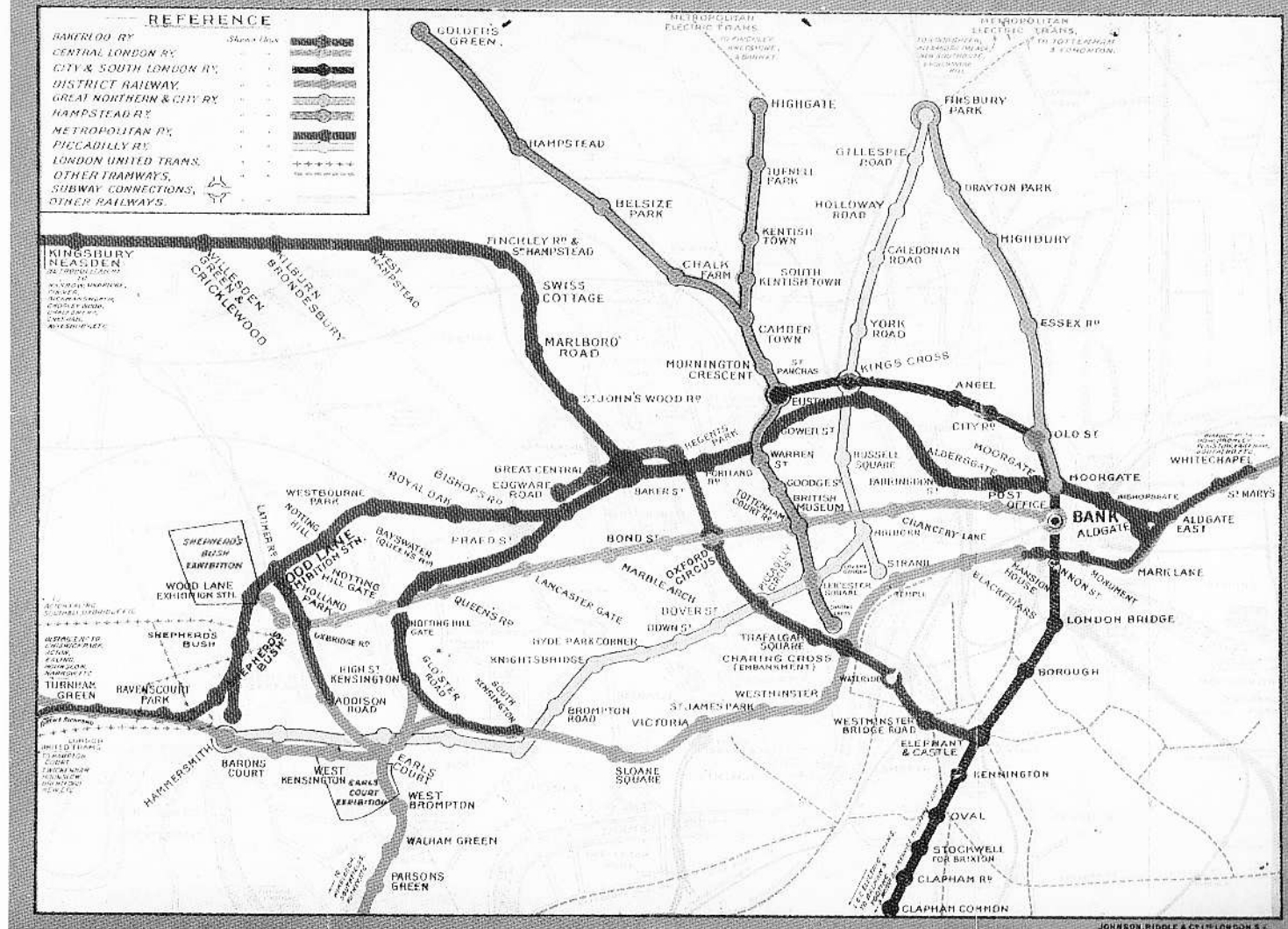
The Diagram reflected this in its unemphatic display of the central area, roughly bounded by the Inner Circle (later the Circle Line), where no single feature was dominant. Equally important, in order to achieve a clear, comprehensive array of features within this central area, it had to be enlarged in relation to the outlying regions. Distortion was thus of the essence. But whereas distortion may often be whimsical, devious or just plain inept, this was purposeful, straightforward and skilful. Furthermore, it represented a view of London and its Underground that people had — albeit unconsciously — been looking out for. One that would cope with the information needs of a growing population now committed to travelling considerable distances to work every day from the new suburbs†, and of visitors from the provinces making their first, timorous acquaintance with the metropolis in increasing numbers throughout the 1930s.

Above any consideration of the Diagram as a navigation aid was the optimistic vision it offered of a city that was not chaotic, in spite of appearances to the contrary, that knew

\* Appearing in a documentary on the Diagram mounted by BBCtv as part of their Design Classics series, the design historian Adrian Forty commented: 'The point about the map was that it made those outlying stations seem relatively close to the centre of London. The prospect of making a journey to Cockfosters or Ruislip, if one had looked at a geographically correct map, would have seemed rather formidable. Looking at the Underground map, it looks reasonably simple.'

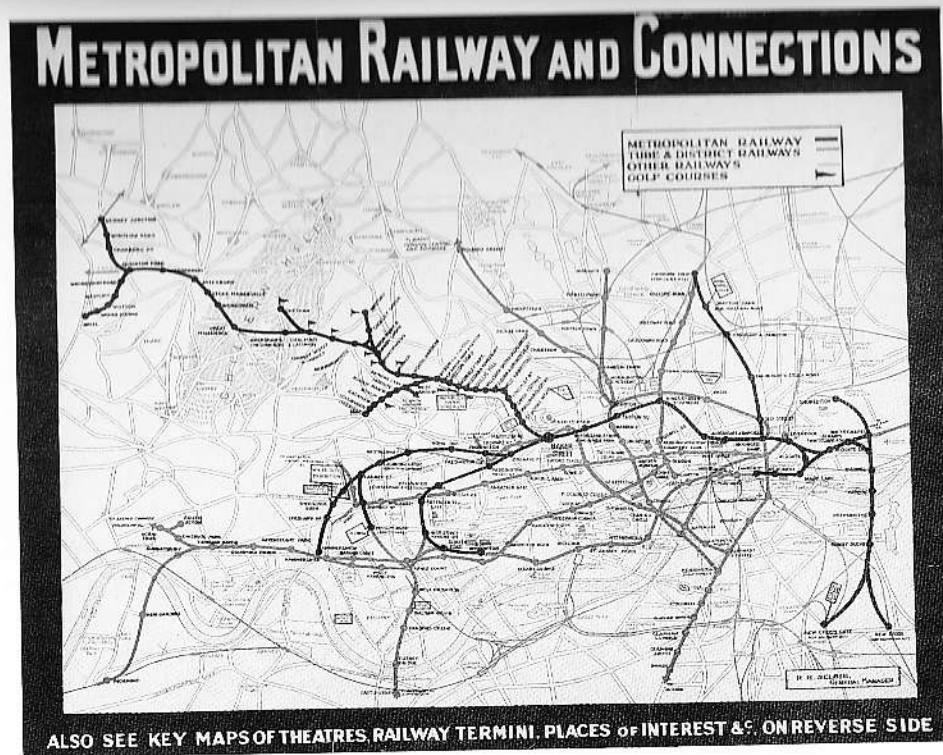
† London's population increased by 1.5 million between the wars. Rides per head of population on London's buses, trams, tubes and trains rose from 259 per year in 1911 to 443 in 1938/39. (Information taken from Weightman and Humphries, *The Making of Modern London 1914-1939*. London 1984).

# LONDON ELECTRIC RAILWAYS



1 Following maps published in 1906 of the main group of four underground railways, the first all-inclusive map was published in 1908 in the style shown here. Note that, although the map appears to be an accurate geographical representation, it is not so: the Metropolitan Railway route from West Hampstead is distorted to run due west and make space for the key directly above it.

2 Map of the Metropolitan Railway, 1923, showing connections with the District Railway and the tube lines. Comparison with the general map of 1908 (p 8) will show that the latter included only the inner portions of the Metropolitan, which at this time extended over the Chiltern Hills to Aylesbury and beyond, to the two branches terminating at Verney Junction and Brill. There was even more geographical distortion on this map than on the 1908 general map; the outlying parts of the line were considerably compressed (see accurate map in Appendix ID).



what it was about and wanted its visitors to know it, too. Its bright, clean and colourful design exuded confidence in every line. Get the hang of this, it said, and the great metropolis is your oyster.

However did they all manage to get along before it burst on their delighted gaze?

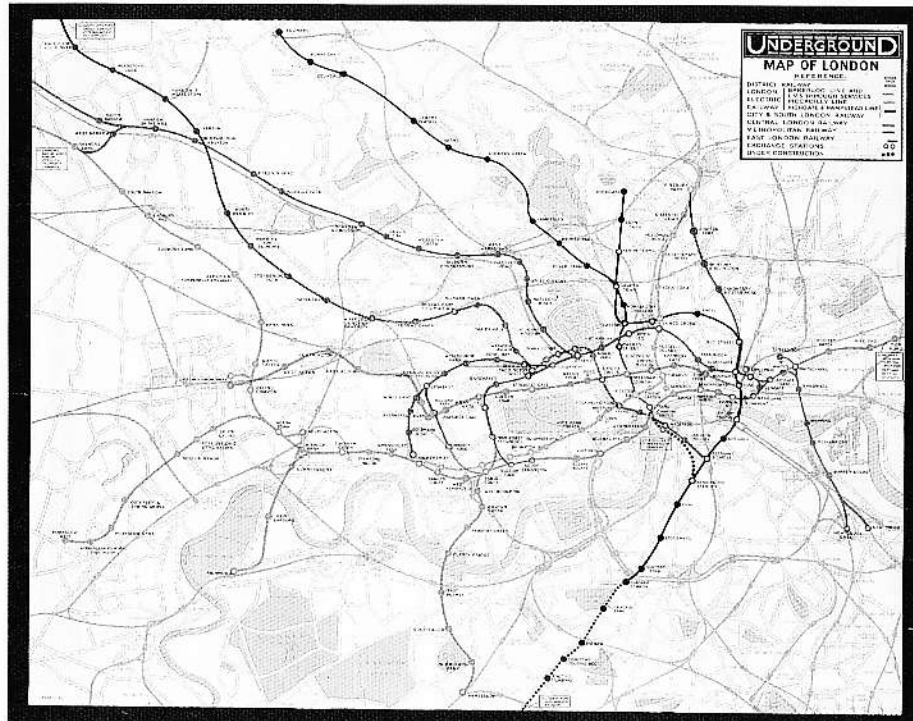
### Before the Diagram

Combined maps of London's underground railways began to be issued for passengers in 1906, when those under the control of an American financier, Charles Tyson Yerkes, were brought together on one map. Though Yerkes died in 1906 his expansionist plans were pursued with vigour by his successors. The following year, agreement between his company, the Underground Railways of London (UERL), and the competing Central London, Metropolitan, Great Northern & City, and City & South London Railways\*, led, among other things, to publication of the first all-inclusive map. The finances of some of these companies were in a

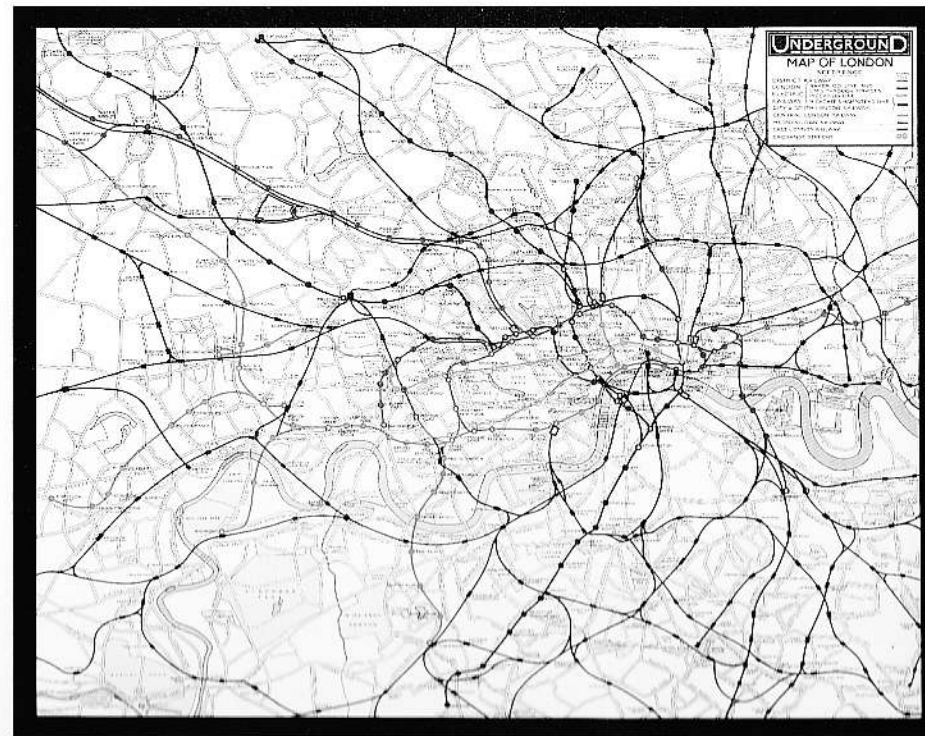
parlous state (none of the three new tube lines opened by UERL in 1906-7 was performing up to expectation, in spite of extensive publicity) and a measure of co-operation on fares and other matters was seen as essential to their joint survival. In 1907 they agreed to promote their joint interests as 'a complete system of underground railways' with the trading name 'Underground'. Another company, the Waterloo & City, decided not to participate, though its line was nevertheless shown on several Underground maps between 1908 and 1913. The first general map, issued in 1908 (1), was admirable in its intention and no doubt very helpful to the hard pressed traveller; but it presented an illusion of unity

\* Given here are the names of the UERL companies as they were in December 1907. They were later to become known as (respectively) the District, Piccadilly, Bakerloo, and Northern. The Central London Railway became known as the Central Line from 1937; the City & South London was absorbed into the Northern in effect from the mid 1920s and by name in 1937; and the Great Northern & City (part of BR from 1976) was renamed the Northern City in 1934. The Metropolitan retained its name unchanged, of course, though even that was temporarily conjoined with the District between 1937 and 1948, sharing the latter's green colour for its route line on the Diagrams at this time.





3,4 Two quad royal maps of 1926 (top, with large border not shown) and 1927 (below), displaying the expanding network. Already, the cartographer was in difficulties with the complexities of the central area. In the 1927 map, the addition of symbols to denote the main line railway terminals, though undertaken with the best of intentions, created a most unhelpful confusion.



which did not at that time exist. In fact, it must be said that it masked the confused result of largely unplanned development and intense competition.

A series of maps produced by the Metropolitan Railway (2) showed its own lines in a strong plum-red and all the others in an undifferentiated blue, and omitted the distinctive logotype employed on maps of the whole network. On this railway at least, a considerable measure of independence was still being maintained in the display of information — and indeed it remained so into the early 1930s. Incidentally, this map vividly illustrates a serious problem confronting cartographers of the Underground, since the Metropolitan Railway extended to the northwest over the Chilterns and beyond Aylesbury to link with the London & North Western Railway at Verney Junction and to Brill on the other branch. Was this extension to be regarded as an integral part of the Underground network, as the map appeared to suggest? Surely not; and in fact it did not appear in its entirety on any general maps of the Underground. Poster maps issued in 1926 and 1927 (3,4) for example, do

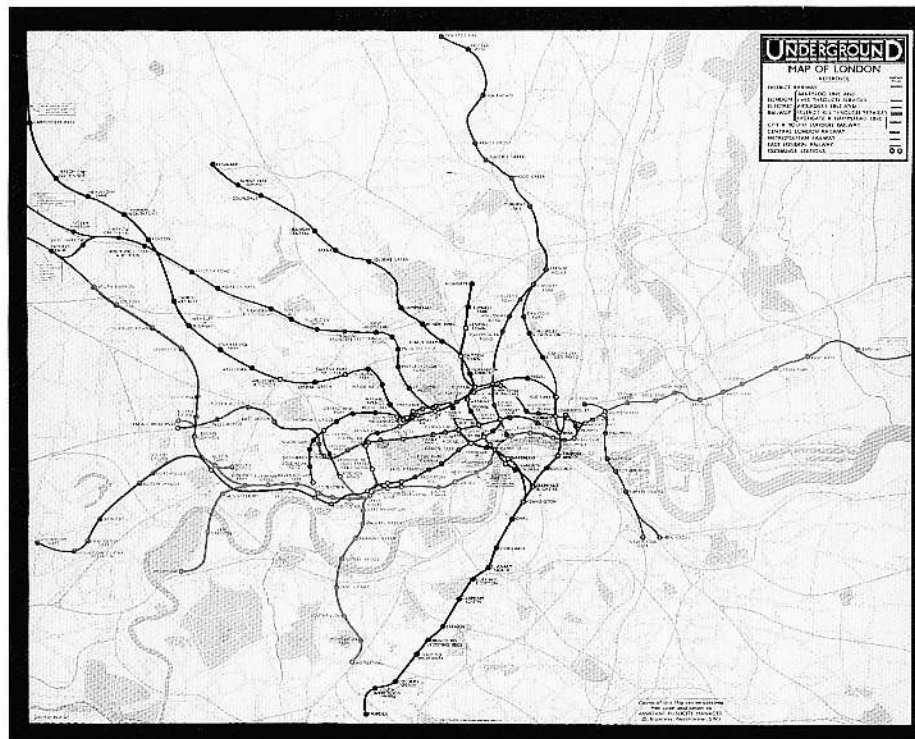
not show, or refer to, any part of that route beyond North Harrow; and other maps (including Beck's first published Diagram of 1933) only indicate the extension as far as Rickmansworth or Aylesbury, although trains continued to run to Verney Junction right up to 1936. Similarly, the District Railway ran a service to Southend until 1939. It appears there was no firm understanding as to where the limits of the Underground network were to be set — at any rate, as far as they were expressed in the authorised map. The fact that such portions of the Metropolitan as that between Harrow and Verney Junction were jointly operated with a main-line company (the Great Central) no doubt complicated the issue. It has to be said that the apparently self-contained nature of the Underground system, symbolised by the 1908 and all successive maps, had the effect of 'freezing out'\* the main-line companies, however diligently the Underground Group indicated interchanges with main-line termini.

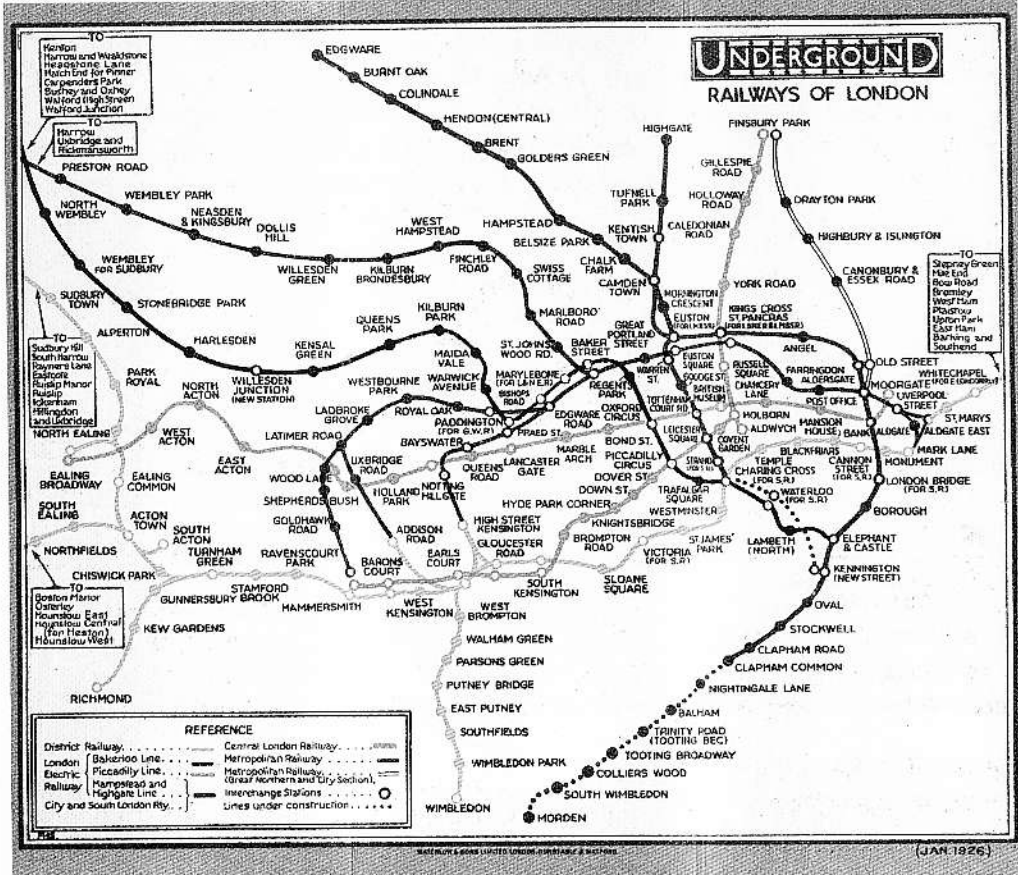
Even with a truncated map, cut off at North Harrow to the west and Bow Road to the east, as in a 1926 version, the car-

tographer was hard put to make sense of the intricate web of connections in the central area; and when a determined effort was made, in a version dated 1932 (5), to show the District Railway's route eastward as far as Barking, the complexities of the central area became too small in scale and too jumbled to be of much use to the traveller. However, a card folder series dating from 1926 (6), bearing the initials of F H Stingemore, a draughtsman with the Underground Group, incorporated a device which is of considerable interest in relation to the Beck Diagram: he engaged in some topographical distortion whereby outlying portions of the routes were compressed in comparison with the central area. Though he must have realised it would be virtually impossible to present the traveller with a sensible map in pocket size format unless he employed such a device, it may be supposed that, as a traditional cartographer, he undertook it somewhat reluctantly.

\* The writer is indebted to Mike Horne for this phrase, and for a number of helpful comments on the development of the Underground during this period.

5 1932 map which included the District Railway's route eastward as far as Barking, with the result that the central area was now so compressed that the detail there was too small to provide any useful information.





6 F H Stingemore's card folder of January 1926 very similar in style to the first edition in the series, published in 1925. A valiant effort to make the network more comprehensible, by means of some compression of the outlying portions and the removal of surface detail. It was only partially successful.

In the light of this delicate, almost surreptitious, distortion it is of interest that the very first general Underground map of 1908 contained a geographical distortion to which no great objection seems to have been raised, since it reappears in a paper map dated 1909 and a card folder c.1912: the Metropolitan Railway's line to Aylesbury was 'redirected' due west from West Hampstead, instead of curving north-west. Clearly, this was done in order to accommodate a reference panel in the top left of the map. Here, within a context of orthodox map-making, is an example of an Underground route being straightened into a horizontal, 23 years before the design of the Diagram. While it is not suggested that this example set a conscious precedent for Beck's proposal, it does indicate a tolerance for, and acceptance of, geographical inaccuracy in relation to Underground

route maps; and close inspection reveals that very few of the Underground maps of the period were really accurate to scale.

Another feature of Stingemore's card folder series of 1925 is the elimination of all surface detail. This undoubtedly assists its clarity, though there remains some unfortunate ambiguity in regard to the central area: it is easy to confuse Tottenham Court Road and Oxford Circus stations, and equally easy to confuse Oxford Circus, Leicester Square and Covent Garden stations. Stingemore must have been made aware of this, since by the 1932 edition of the card folder (7) he had amended it so as to expand the area round these stations. This allowed the station lettering more space and reduced the possibility of confusion — another instance of discreet geographical distortion.

Further comparison between figures 6 and 7 shows one other important modification: in the earlier design there was no representation of the River Thames, whereas there was in the later design. It has been established that the river was omitted on the Stingemore card folders from their inception in 1925 until April 1926, from which time it was consistently shown on card folders until the last Stingemore edition of 1932. The exclusion of surface detail from Underground maps was a gradual, not a sudden, development. A paper pocket map of c.1909, headed 'London Electric Railways' (of which a detail is shown in figure 8) had already reduced streets and other features such as surface railways to faint, barely legible markings; though it did show tramways and surface railways; a card folder of c.1912 (already mentioned in the previous column) excluded streets and surface railways but included the Royal parks and the River Thames; and a series of maps drawn by the calligraphic artist MacDonald Gill and published in the early 1920s excluded all surface detail, even the River Thames. It is reasonable to suppose that these examples were available to Stingemore and, subsequently, to Beck.

At this point the writer has to confess to an error in his earlier account\* of the development of the Diagram, in which it was implied (though not expressly stated) that Beck had invented the 'white-line connector' symbol for interchange stations; but this was not so, since a map by an unknown hand (8), headed 'London Electric Railways' of

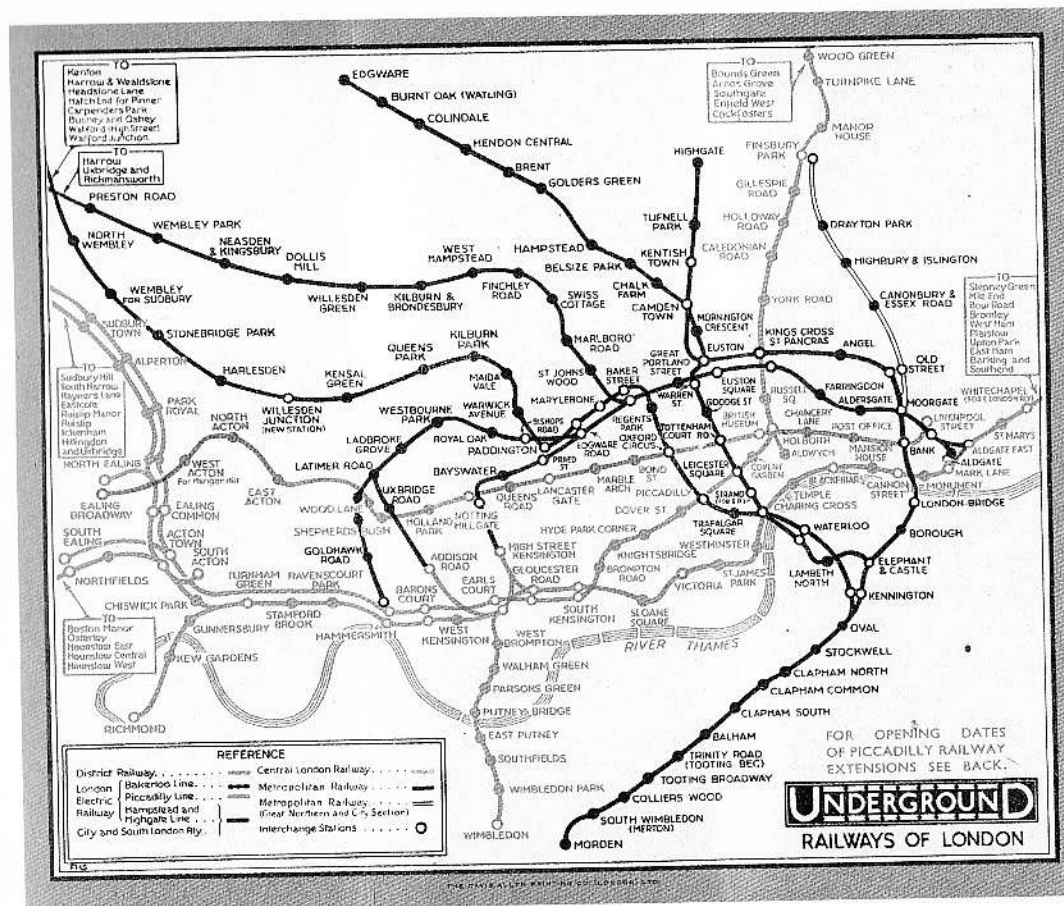
\* Garland, K, 'The design of the London Underground diagram', *The Penrose Annual* 62, London 1969.



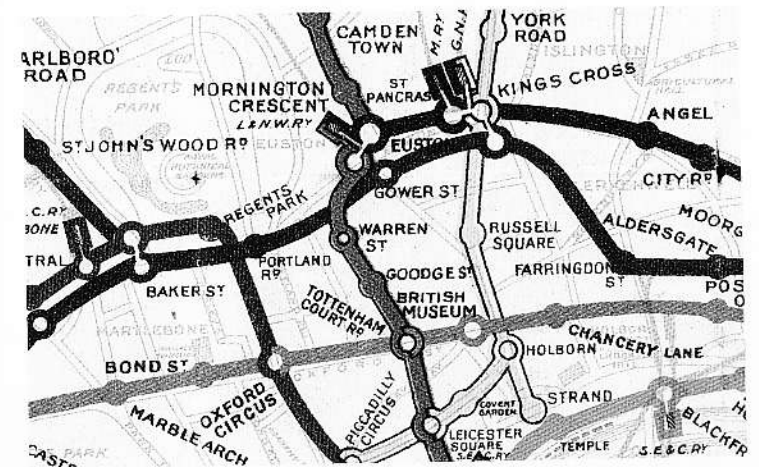
c.1909, clearly shows exactly the white-line connector (as, indeed, does the c.1912 pocket map already referred to). But in any case we shall see later that the white-line connector may not have been considered to be a useful device from about 1912 since it does not reappear until Beck's Diagram of 1946. As for links with main line stations, these were not indicated in some wall maps of 1926 or 1932 (3, 5), but were given special significance in a wall map of 1927 (4). Though titled 'Underground map of London' it does in fact incorporate main line routes into London, their stations differentiated by the use of rectangles. The result is confusing and

unhelpful, especially as no reference is made in the key box to these main line route indications (surely an oversight?).

The problems of representing the increasing complexity and expansion of the network were becoming acute by the early 1930s. Stingemore's efforts, though resourceful and well intentioned, provided no more than a partial answer. It was high time for a more drastic solution.

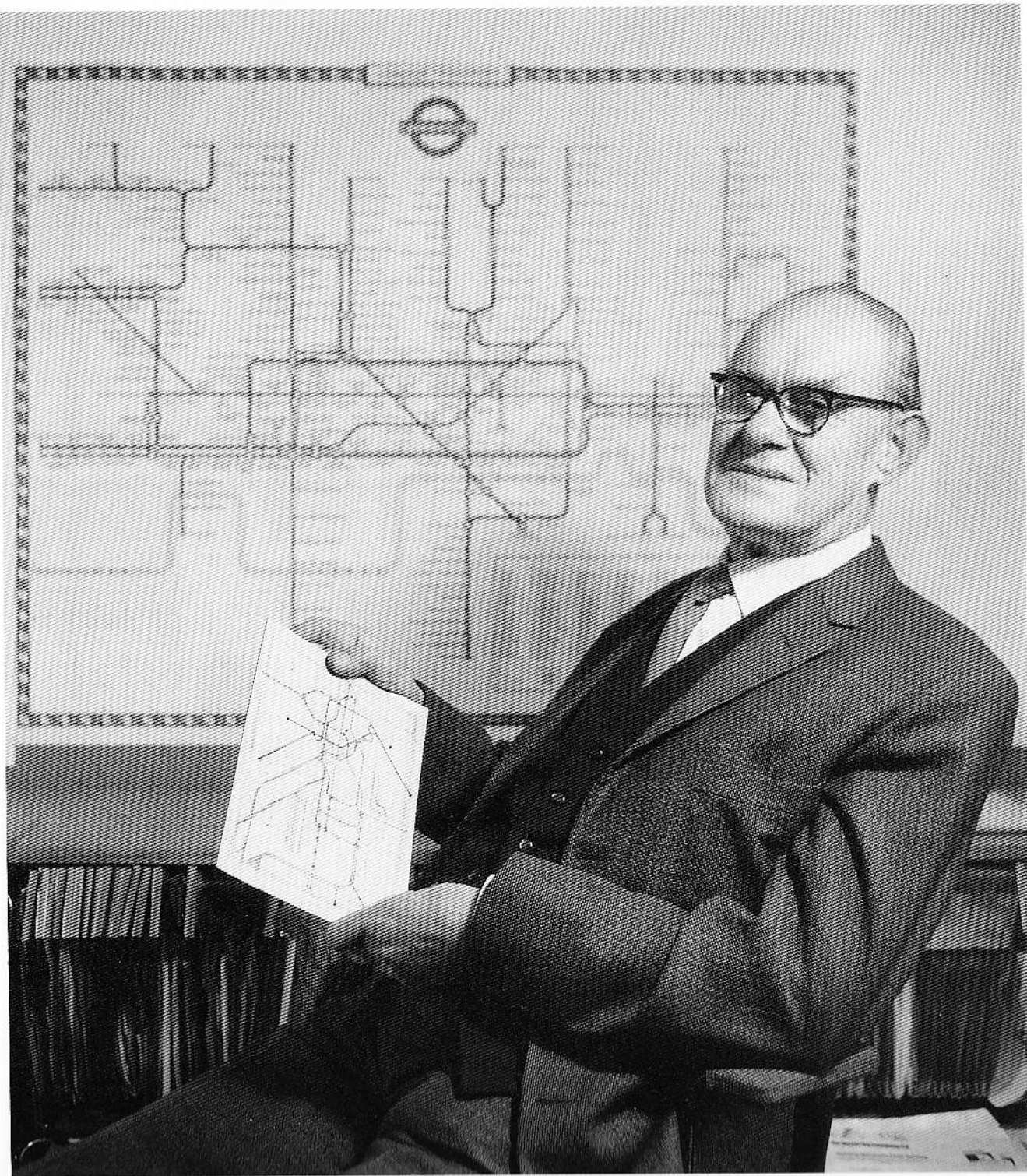


7 Stingemore's last card folder (left), produced in 1932. There was a slight expansion of the central area in comparison with his 1926 version, probably in response to the public's continuing difficulty in deciphering the detail. From April 1926 he had added the line of the River Thames – another concession to the bewildered traveller, perhaps.



8 Detail from 'London Electric Railways' map of c.1909 (above), showing the first use of the 'white-line connector' device for denoting interchange stations. Note, too,

the rectangular symbols for main line termini, also linked by white lines to the Underground stations of the same name. Size of whole map 11 x 14 1/2 in (282 x 362 mm).



Harry Beck in 1965, holding the exercise book sketch made in 1931.

Photograph: Ken Garland



# The Birth of the Diagram

Henry C Beck (Harry to his friends) was a 29-year-old engineering draughtsman when he produced his first sketch for the Diagram in 1931. At that time he was out of work: a victim, and not for the first time, of the sudden, wholesale sackings that afflicted the public sector and related service industries such as Beck's erstwhile employers, the Underground Group. Ever since 1922, when the government-appointed Commission on National Expenditure chaired by the Tory politician Sir Eric Geddes had first advocated savage economies (the so-called 'Geddes Axe'), Harry Beck and his fellows knew they could be dismissed at short notice, especially if, like him, they were only contracted as temporary employees. In fact, he had been 'temporary'\* since his first appointment as a junior draughtsman in the Signal Engineer's office of the Underground Railways in 1925.

Beck's own account of his life at that time, written in 1968 at the request of the present writer, gives an illuminating glimpse of the man himself:

*I must have lived a very energetic life in those days. Commuting from Highgate Village, I rarely missed my daily dip in Highgate Pond before breakfast. I became a member of the Signal Office rowing club, rowing behind stroke in a half-outtriggered four. I belonged also to the T.O.T. [Train, Omnibus and Tram Staff] Philharmonic Society, to which I was introduced by fellow-draughtsman Fred Webber. But my participation in these social activities had to end because of the temporary nature of my employment.*

*This was the decade when many a competent artist joined the long and weary queue seeking any work in any department of graphic art. Some months of this, and I consider that I was lucky to be remembered, and recommended for a temporary draughtsman's job, by Ben Lewis, a member of the Philharmonic Society who worked in the Drawing Section of the Establishment Office. I*

*think that my joy at my recall to the 'old firm' may have sharpened an impish sense of satire, for at home I was mostly to be found doubled up over a drawing board: I kept the staff magazine well supplied with my particular brand of humorous drawing†.*

*Dismissal again. I was gently told that there was no alternative... the staff of every office had to be pruned, and the last temporary taken on must be sacked.*

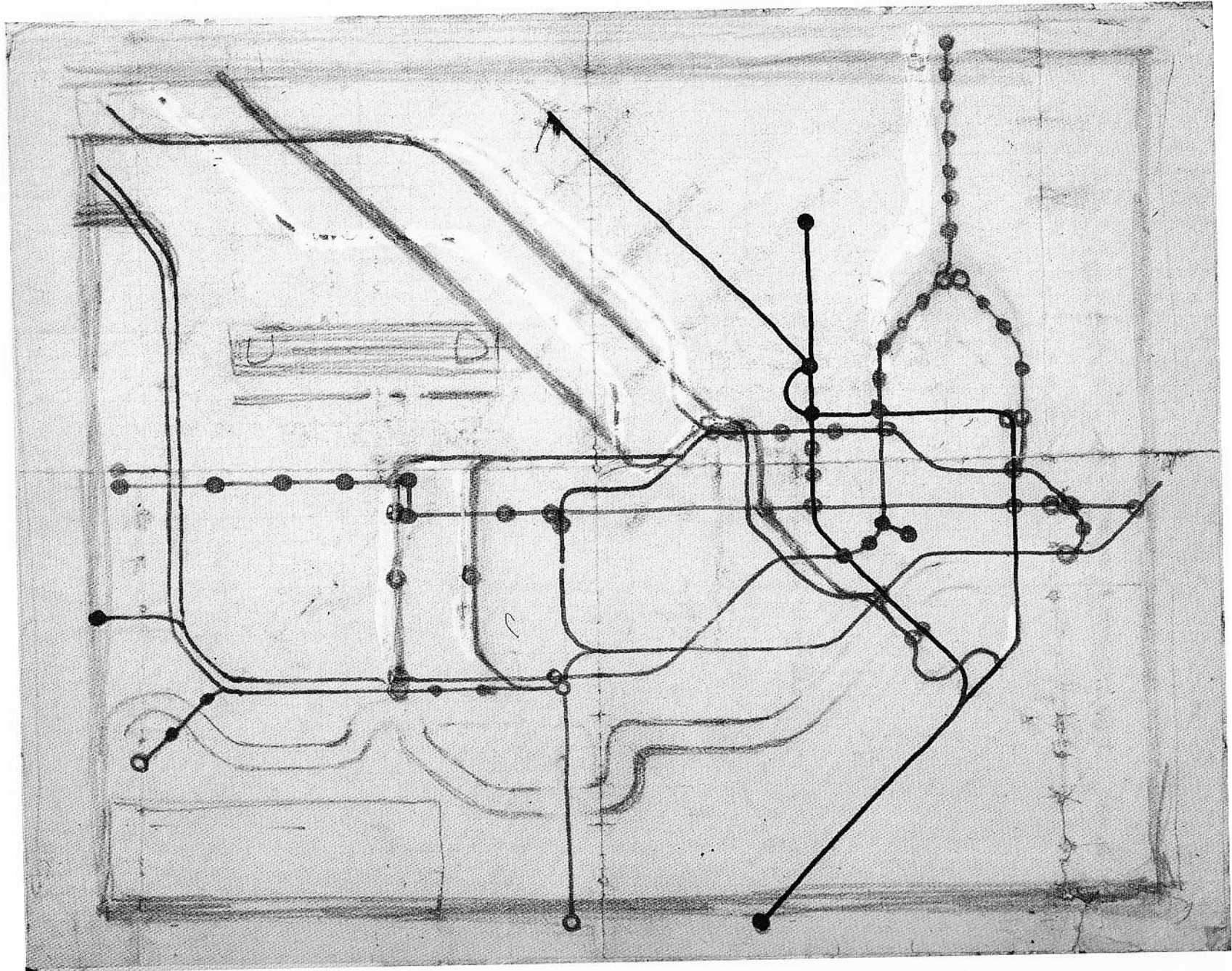
There follows a passage describing his conception of the Diagram, of which more below. Then:

*Lucky for me, pressure of work in the Establishment Office drawing section had built up to such a level that I was invited to return: a letter came offering me further temporary employment, and I was back on the staff a third time.*

Bryce Beaumont, who joined the same office as a copywriter in 1936 and who came to be a friend as well as a close colleague, remembered Beck affectionately in a conversation with the writer in 1968. At first, he said, he was in awe at being confronted with the creator of the already renowned Underground Diagram, but was soon more impressed by his benevolence, his pleasing baritone voice and a sense of humour which often relieved the monotony of office work (see Appendix M).

\* Temporary staff had fewer rights and less security than 'established' staff. Junior grades could be employed on this basis for many years. The term is not to be confused with the present day temporary worker ('temp' colloquially) usually recruited by an agency and moving from one employer to another as needed.

† Stingemore also indulged in humorous drawings. Perhaps the serious business of map-making and diagramming needed to be balanced by a more frivolous use of their graphic skills.



9 Beck's original sketch for the Diagram, made on two pages of an exercise book. Here are the significant features of all the future versions of the design: simplification of the route lines to verticals, horizontals

or diagonals; the expansion of the central area; and of course, the elimination of all surface detail except for the line of the River Thames, itself presented in the same stylised form as the route lines.

11 Unpublished proof for the first card folder edition, corrected in Beck's own hand. Though he still retained the blobs, he had substituted diamonds for the rings at all interchange stations; and the bar of the Underground logotype was now backed by the red ring to comprise the already familiar 'bullseye' device. All the lettering in this proof was hand drawn by Beck in what he described as 'Johnston-style' capitals. It was a rather loose interpretation – condensed where necessary, as can be seen by comparing Tottenham Court Road with Oxford Circus.

The first proof of the Diagram (11), in card folder form, was virtually identical to the presentation visual. The only differences of any note were that outline diamonds replaced rings at all interchange stations, that the new branch from Wembley Park to Stanmore was added, and that the Underground Group's black and white logotype – the bar – was now backed by the red ring, the two comprising the bar-and-circle device (often referred to as the bullseye) that had been in increasingly common use on platforms and outside stations since about 1918, though somewhat less commonly on the Underground maps.

In Beck's account of the genesis of the Diagram he makes no mention of the stylized representation of the River Thames, the only surface feature included, and by that token one of the greatest importance. It could be argued that the inclusion of the River Thames was unnecessary and even distracting. However, the travelling public did not think so. (In an informal questionnaire undertaken in 1968 when the writer was preparing the earlier account of the design of the Diagram already referred to, Tube travellers were asked,

among other things, whether or not they found the inclusion of the river on the current diagram to be useful: *without exception* the respondents said they did. Though the questionnaire was not conducted with scientific rigour, the unanimity of response is surely significant.) Given the relative thickness of the river in relation to the route lines, however, it could be said to be too heavy in the first proof; and indeed, it was to be reduced in tone on the printed version.

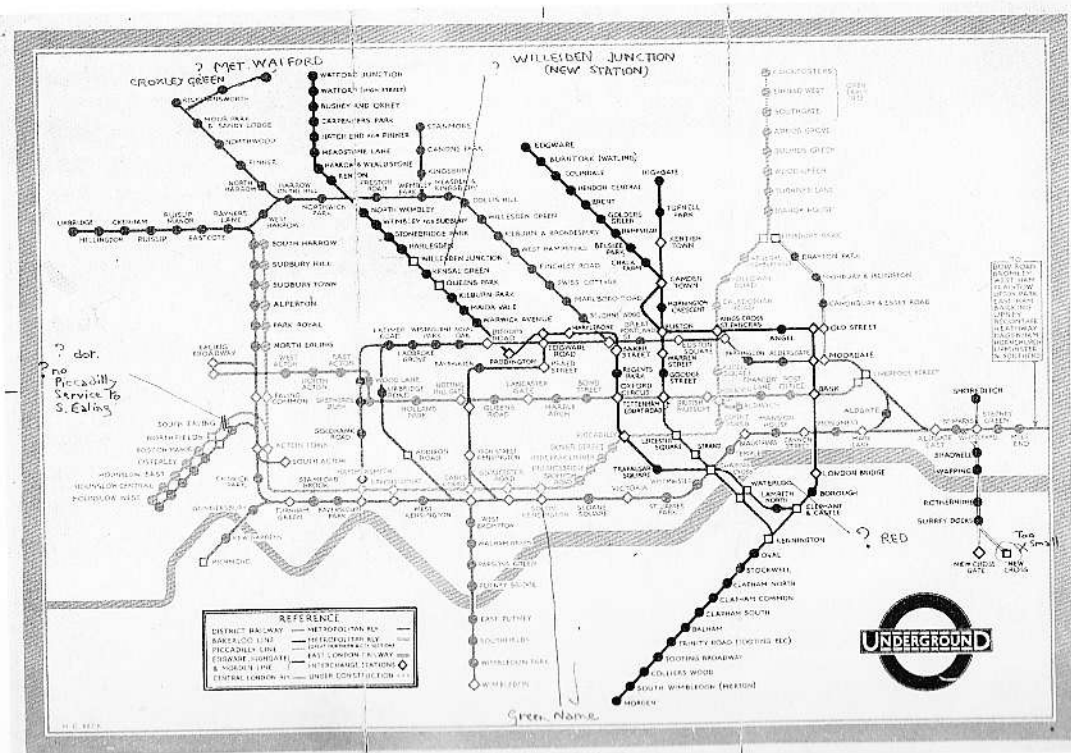
All the lettering in the first proof – some 440 words – was executed by hand in what Beck described as 'Johnston-style' capitals (see 14). In fact, Beck took liberties with the letterforms, condensing them as appropriate (compare Tottenham Court Road with Oxford Circus, for example).

In the first printed edition of the Diagram (12) the whole thing was redrawn from scratch, with what Beck called 'ticks' replacing the blobs denoting non-interchange stations. This change had three significant advantages: (a) it lightened the Diagram overall, giving it a more elegant appearance; (b) it rectified an imbalance whereby the non-interchange stations appeared bolder than the interchange stations; and (c) each tick pointed unambiguously to the station name to which it referred, so that they could be arranged alternately on different sides of the route lines for greater compactness. There was also an important colour change: the Piccadilly Line was changed from pale blue to dark blue, thus avoiding confusion with the green of the District Railway.

As regards the debut of the Diagram there is some disparity between Beck's account and the documented record. Writing long after the event he said:

*Even after the idea was accepted the Publicity Manager was not any too sure about it, and decided to give it a trial run, inviting the travelling public to comment on the new format.*

This and a further recollection, given in conversation with the present writer in 1968, that there was a limited initial printing of 'some hundreds', are not borne out by any other evidence. It has been verified that the first edition of the card folder was printed in a quantity of 750,000 and that it was issued in January 1933. If there was, in fact, no trial run, one is left to wonder how the Publicity Manager could have committed the Underground to so vast an initial print order in view of (a) the revolutionary nature of the design, and (b) his own uncertainty about it?





## The response of the public to the Diagram

The ordering in January 1933 of 750,000 copies at a cost of £337 10s (equal to about £12,000 at today's prices) was a remarkable turn-around in the official attitude towards the map. That other printings followed soon after – there was one of 100,000 copies in February – is evidence enough that the Diagram was well received by the travelling public.

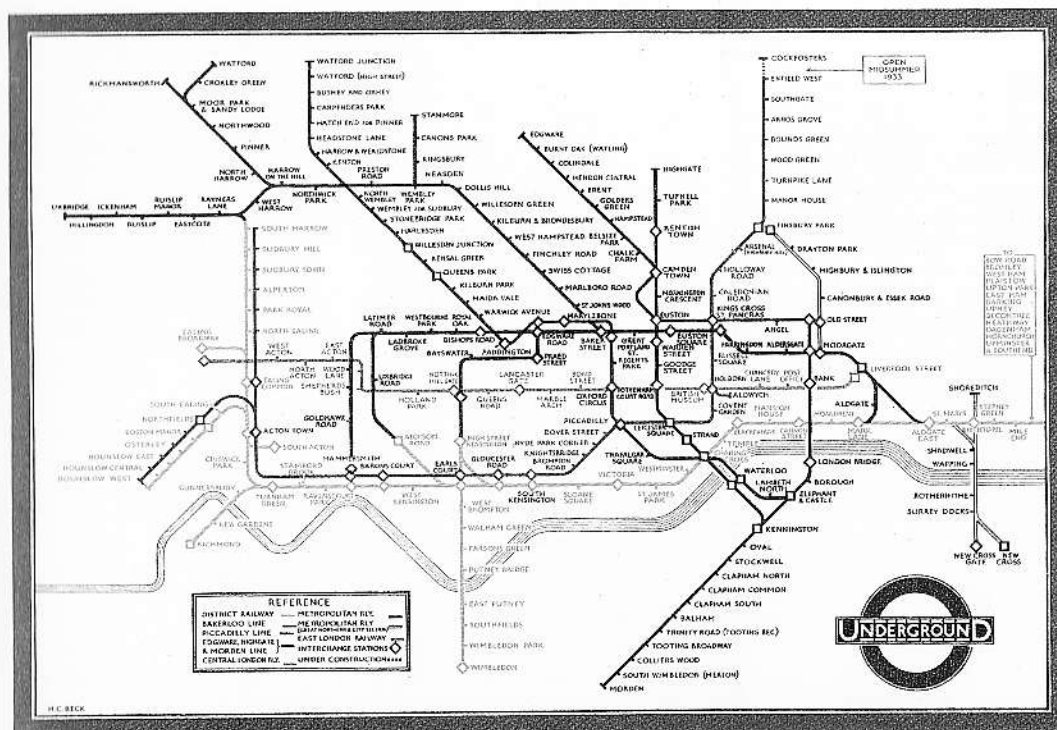
Why did people take so quickly to this unfamiliar, uncompromising Diagram? The British public is not reputed to welcome innovation, especially in matters visual. Perhaps the answer lies in the fact that it was so obviously useful; people couldn't resist its helpful character, appreciating instinctively that its designer, himself an ordinary, Tube-travelling commuter, was concerned for *their* information needs and not for novelty for its own sake.

Less easy to understand, perhaps, is the great affection in which the Diagram has been held by the public, ever since its first appearance. It might have been expected that the advent of such an abstract, schematised image would generate

a response similar to one's first sight of a Mondrian painting; respectful, awed, intrigued, maybe mystified, but surely, never *affectionate*? Yet it was so.

Beck was commissioned to undertake the artwork for a quad royal (40 x 50in/1016 x 1270mm) poster, of which an edition of 2,500 was printed in March 1933 (13) and a second edition of 2,000 in August. These were large print orders for posters: a typical print order for the 'artistic' double crown (30 x 20in/762 x 508mm) posters on the Underground at that time was 1,000. Suddenly the Diagram was big business — for the printers of the card folders and the posters, and for the new London Passenger Transport Board which could not have had a better signal for its inauguration as the controlling authority for London's tube, bus, train, tram and trolleybus network on 1 July 1933 — but not for Beck himself, who was paid 5 guineas (£5.25) for the complete poster artwork.

So what had happened was this: in his own time and on his own initiative, an ex-employee of the Underground Railways invented a way to represent London's underground



12 First card folder edition of the Diagram (left) and centre portion of the reverse, folded to form a cover (right), issued in January 1933. The blobs had been replaced by 'ticks' and this simple alteration transformed the design completely, giving it an elegance lacking in the earlier proof. It is difficult to imagine how the increasingly complex versions of the Diagram that were to follow would have succeeded without this small but crucial innovation. Records show that Beck was paid 10 guineas (equal to £380 at today's prices) for the design and artwork. The oft-quoted figure of 5 guineas was the amount paid to him for the quad royal poster artwork.

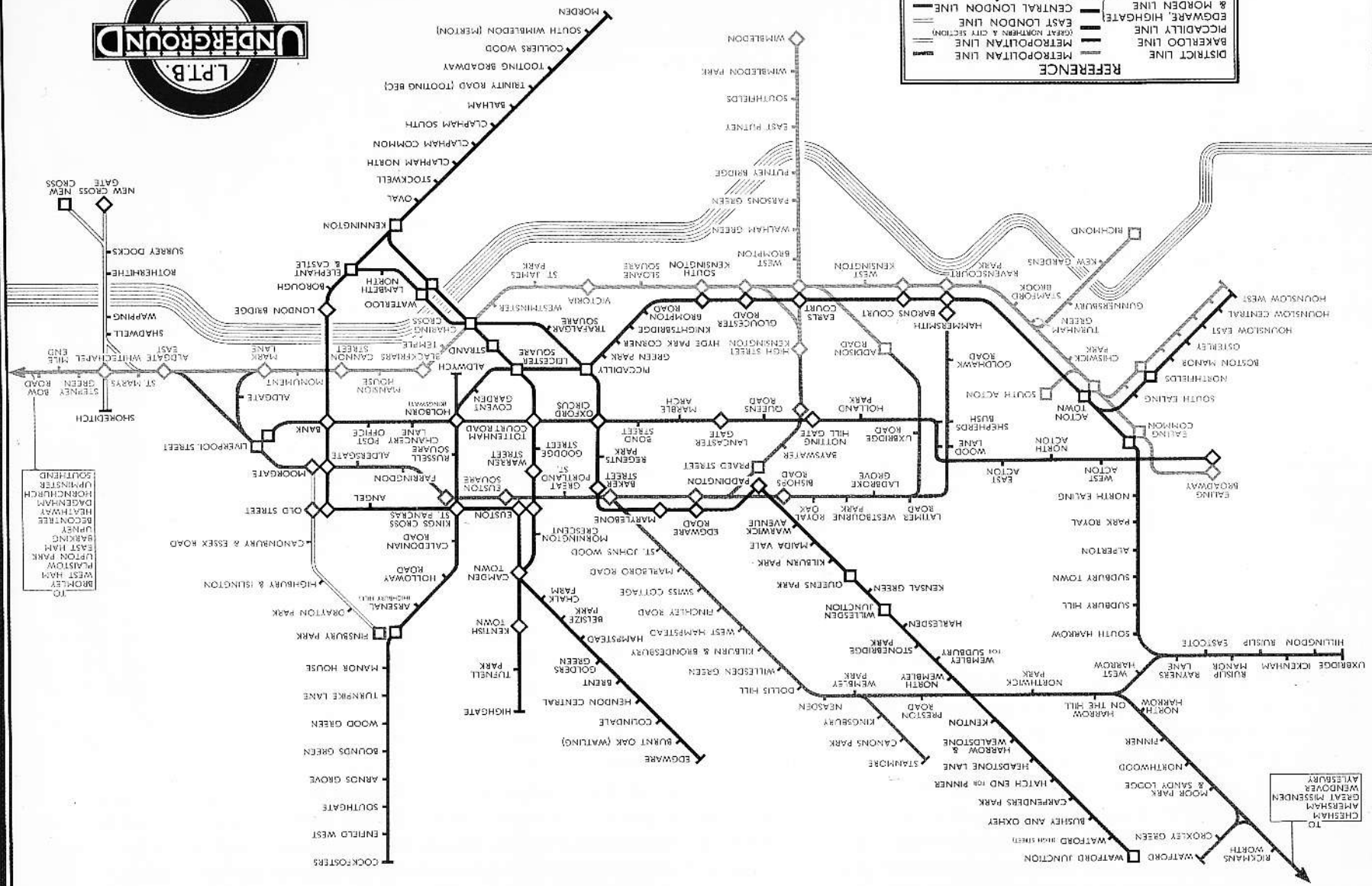




ISSUED BY LONDON PASSENGER TRANSPORT BOARD 35, BROADWAY, S.W.1

**REFERENCE**

- DISTRICT LINE
- BAKERLOO LINE
- METROPOLITAN LINE
- GREAT NORTHERN & CITY SECTION
- EAST LONDON LINE
- CENTRAL LONDON LINE
- & MORDEN LINE
- INTERCHANGE STATIONS



TO  
BROMLEY  
WEST HAM  
LUTON PARK  
EAST HAM  
DAVENHAM  
BECOMPTREE  
UPNOR  
HEATHWAY  
HORNCHURCH  
SOUTHBEND

TO  
CHESHAM  
WINDOVER  
WATFORD  
ATLESBURY

network in diagrammatic form, laying emphasis on its connections rather than its geography; it was flatly rejected by the management; a year later he had another go at them and this time it was cautiously accepted; he was paid a derisory fee; then, although the first card folder edition was printed in substantial quantity, the fact that it contained the request 'A new design for an old map. We should welcome your comments' did not indicate total commitment on the part of London Transport\*; the public, however, loved it and suddenly the designer was the blue-eyed boy; his fees, however, remained derisory.

Beck had returned to the employ of the Underground Group in 1932 and was retained on the staff at the inauguration of the London Passenger Transport Board (though he remained a 'temporary' until 1937); so during the artwork, process work, proofing and trial of the card-folder, and then subsequently for the whole of his work on the Diagram, he was both an employee and a contracted freelance. While this situation did, indeed, provide a most valuable insight into the Underground system which no outsider could possibly have gained, it also gave him a problem of status as a designer which dogged his relationship with his client from

the very inception of the Diagram and for the larger part of his working career and after.

Harry Beck married in 1933. Nora Beck could not have known then (neither could her husband) that she had married an obsessive; but he was already fully involved with his invention at the time of their wedding. One wonders if their lives might have been different had she been able to experience at least a couple of years of married life before his — and her — absorption in this totally demanding task. But they were to spend the whole of their married lives under its spell. If Nora had been able to foresee the pain this obsession would bring them in the last years of their marriage, would she have made attempts to steer her spouse away from it, for both their sakes? Perhaps, but the high probability is that it would have made no difference; he was determined to guard and nurture his creation against all opposition.

\* In a revealing memo to his Publicity Manager dated 3 August 1933 (that is, long after the Diagram had proved to be a resounding popular success), Frank Pick, Vice Chairman and Chief Executive of the LPTB wrote: 'I had a look at your quad royal map. I confess that upon a large scale this looks very convenient and tidy and is a better map than any we have had so far.' That Pick felt it necessary to 'confess' hints strongly at an earlier lack of enthusiasm; and his phrase 'convenient and tidy' is hardly wholehearted praise for an invention of genius.

13 First quad royal poster of the Diagram, with the imprint '646 . 2000 . 20 3 33' , and the line 'Issued by London Passenger Transport Board' under the reference key. In the few months that had elapsed between the publication of the first card folder in January 1933 and the imprint date on the poster, the design had become a popular success, the first printing of the card folder having been promptly followed by a reprint. The publication of the poster confirmed the primacy of Beck's design as the authoritative representation of the network. Some refinements incorporated since the first card folder edition were: the straightening out of the Bakerloo Line at its northern end, to form a clean diagonal all the way from Paddington to Watford Junction; the 'diagonalisation' of the Stanmore branch of the Metropolitan Line, so avoiding the unhappy rightangle where it diverged from the main

route after Wembley Park; the transferral of Mornington Crescent from the right-hand to the left-hand of the twin lines between Euston and Camden Town, establishing a double-diamond interchange for Euston at the same time; the disappearance of the British Museum station on the Central London Line; the 'diagonalisation' of that portion of the Metropolitan Line between Notting Hill Gate and Edgware Road, avoiding the awkward kink around Paddington; the off-Diagram labelling of the Metropolitan Line beyond Rickmansworth to Aylesbury; and the substitution of more accurate reproductions of Johnston's specially commissioned sans serif type (see 14) instead of the freely interpreted version Beck had employed on the first card folder. Johnston's letterforms were generously proportioned and the use of capitals only required ample space between the characters. Paradoxi-

cally, this apparently inappropriate edict was to be a key factor in generating a long sequence of designs of rare clarity and distinction. The publication date of the first poster is uncertain: the omission of British Museum station (not closed until 24 September 1933) and the clear indication that the Piccadilly Line was now in operation as far as Cockfosters (opened on 31 July 1933) suggest that the poster was not intended for publication on the imprint date of March but later, perhaps to coincide with the LPTB's inauguration day of 1 July 1933. For many, the first quad royal poster is considered the best of all the many editions executed by Beck over the 27-year period of his stewardship of the Diagram.

ABCDEFG  
HIJKLMNOPS  
TUVWXYZ

14 Capital letters from Edward Johnston's 'Underground Railways Sans' typeface, used on all versions of the Beck Diagram from the first quad royal poster of March 1933 (lettering for the first card folder of January 1933 having been a somewhat inaccurate, hand-drawn version of this typeface). Although commissioned by Frank Pick, then Commercial Manager of the Underground Group, in 1913, Johnston did not come up with his design until 1916, and it was cut as an exclusive typeface in 1918.



Although the pattern of the Underground network had been well established by 1933 — there was no completely new Tube line until the opening of the Victoria Line between 1968 and 1971 — some of the existing lines were considerably augmented throughout the next quarter century. Here is a list of the major changes in that period:

Piccadilly Line extended northward from Enfield West (Oakwood) to Cockfosters in July 1933, and westward from South Harrow to Uxbridge in October 1933 (taking over from the District Railway).

Metropolitan Line extended eastward from Whitechapel to Barking in 1936.

Northern Line extended northward from Highgate (now Archway) to East Finchley in 1939.

Bakerloo Line extended northwest from Baker Street as far as Stanmore in 1939 (paralleling the services of the Metropolitan Line to Wembley Park and replacing them to Stanmore).

Northern Line extended northward from East Finchley to High Barnet in 1940 with a branch to Mill Hill East in 1941.

Central Line extended eastward from Liverpool Street to Stratford (taking over from the London & North Eastern Railway) in 1946, to Woodford and Newbury Park in 1947, to Hainault and Loughton in 1948, to Epping and Ongar in 1949 (though not electrified until 1957); also westward from North Acton to Greenford in 1947, and from Greenford to West Ruislip in 1948 over the British Railways ex-Great Western Railway route.

From the above list it can be seen that the designer of the Diagram had to grapple, almost continuously, with the growth and development of the system itself. Indeed, Beck's very first published Diagram of 1933 incorporated a

reference to some work under construction (Enfield West to Cockfosters), while the second design — issued a few months later by the LPTB — showed the Metropolitan Railway extending beyond Rickmansworth to Aylesbury, the District Railway branch from Ealing Common transferred to the Piccadilly Line, the renaming of Dover Street station as Green Park, and the proposed closure of British Museum station.

Many designers, it may fairly be supposed, would have regarded each change in the system with some irritation; to be dealt with appropriately, of course, but more as a matter of contractual obligation, or duty, rather than with any sense of eager anticipation. Yet eagerness is exactly what Beck brought to the challenge of every change with which he was presented; partly because, having been an employee, off and on, of the Underground Group since 1925, he was well adjusted to its dynamics; partly because these required modifications to the Diagram would provide him with the opportunity to do some more fine tuning on other aspects of the existing design; and, importantly, because by tackling them with enthusiasm he would be more likely to ensure that the design of the Diagram remained firmly in his own hands. (It may be for this reason that Beck was so amenable to the many suggestions for 'improvements' to the Diagram which were fired at him from the management, including the Board's Chairman, Lord Ashfield, and which were for the most part unhelpful, impractical or even downright fatuous. More of these later.)

In addition to the changes actually effected, there were a number of extensions that received official sanction but which, usually because of shortage of funds, had to be postponed and eventually abandoned. These proposals, too, were frequently required to be shown on the Diagram. Typically, an elaborate development of the Northern Line, ex-

15 One of two pages of briefing notes (right) recorded by Beck following a briefing meeting on 26 January in connection with a forthcoming edition of the Diagram.

tending northwest from Finsbury Park to Alexandra Palace, authorised in 1935, appeared in the Diagram from 1937 to 1941 and again from 1946 to 1950, but was eventually abandoned. These, and several other proposals that never saw the light of day, presented problems every bit as demanding as those that did, to the Diagram's designer.

Even without the special demands arising from proposed extensions, there would be a continuous stream of adjustments and alterations which he was required to implement. A note made by Beck in 1952 (shown at right) sets out a number of these agreed on at a meeting called to discuss the next edition of the Diagram. The nine alterations noted here bear witness to a heavy meeting; all the more so when you notice that they are based on 14 separate drawings submitted by Beck, each one concerned with some aspect of the one edition.

By his own account, Beck appears to have accepted these demands in good part and tackled them promptly:

*...these jobs often ran away with all my 'leisure' time for weeks on end. There was the time that I had to forgo sleep for a whole week-end; I was approached on the Friday and asked for a completely finished Diagram, to include some proposed new extensions, and could it be ready by Monday morning, please? It was, and I should mention that during office hours my thoughts were completely concentrated on my Press advertising work\*, and did we not work until noon on Saturdays then?*

And on the general approach to the dynamics of the problem he writes, with an intriguing choice of metaphor:

*Surely the Underground Diagram...must be thought of as a living and changing thing, with schematic and spare-part osteopathy going on all the time.*

It is on this assumption that we shall now examine the evolution of the Diagram from its inception to Beck's last version of 1959.

\* From 1934 Beck had transferred to the Press Advertising Section of the Publicity Department, where he made layouts, checked proofs, and interviewed artists and writers.

~~On~~ On 26th January 1952 the Publicity Officer approved the general layout of Drawing No. 7 with the following alterations:

- (a) Thicken lines to take names of lines as on current diagram
- (b) Add grid lines and substitute plainer bullseye
- (c) Re-arrange section of Piccadilly Line to reduce congestion on District Line (Vile area)
- (d) Reduce congestion on Aylesbury section
- (e) Reduce congestion on Northern Line (southern section)
- (f) Waltham Green: change to Fulham Broadway
- (g) River Thames to be named
- (h) Draw out suggestions for indicating interchange with Main Line
- (i) Make the name London central

Drawing No. 7 is returned herewith. As many as possible of the above alterations have been shown on Drawing No. 9. Drawing Nos. 10 and 11 show alternative ways of indicating Main Line interchange. Drawings Nos. 12, 13 and 14 show ways of opening out congested areas.

Notes on alterations

- (a) This has been done. Dwg. 9 (Hammersmith section) shows ~~actual~~ <sup>alternative</sup> treatment
- (b) and (c) carried out on Dwg. 9
- (d) On Drawing 9 The Aylesbury congestion has been slightly reduced, but Dwg. 14 shows a ~~much~~ more effective treatment for that area
- (e) Drawing 9 has been kept to the standard. The ~~design~~ <sup>idea</sup> had in the past been reduced without <sup>PTD</sup> alteration to force size, and this has given the limits of proportion.

A strong claim can be made for the proposition that the quad royal poster version of the Diagram dated March 1933 is the classic version: refined, harmonious, excellent of its kind. Certainly, it is all of these; and it has, in addition a quality of elegance that lifts it above the category of sound information design into something with a wider, more general significance.

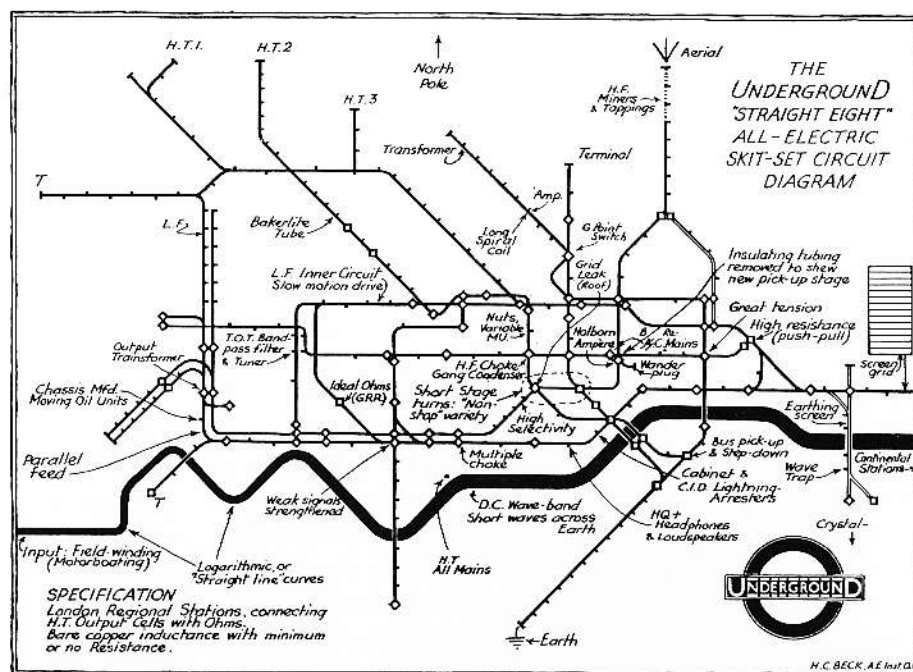
Although this was only the first poster version of the Diagram, the design had improved considerably since the presentation visual of 1931. The use of blobs to denote stations, retained in the first, experimental proof of the card folder, had been rejected in favour of 'ticks' for the first

published edition; diamonds had been chosen as the most suitable way of showing the interchange stations; and the hand-drawn lettering of the card folder edition had been replaced by accurate reproductions of Johnston's Underground Railways Sans type (14). Simply because there was more room, a more delicate balance of weight between route lines and lettering was possible in a large poster format.

The second edition of the poster (16), dated August 1933, though very similar to the first, had an unhappy and inappropriate intrusion: a north pointer. This was added by some busybody who had no appreciation of the difference between a map representing geographical reality and a purely geometric, straight line diagram representing connections. Beck was not informed, let alone consulted, before its inclusion, and contrived stealthily to remove it at the earliest opportunity. Another change was the substitution of rings for diamonds to denote interchange stations. While it is undeniable that diamonds proved to be less convenient than circles for the purpose, there was, it can be argued, a special character about the former that lent this version of the Diagram a rare, perhaps unique, distinction.

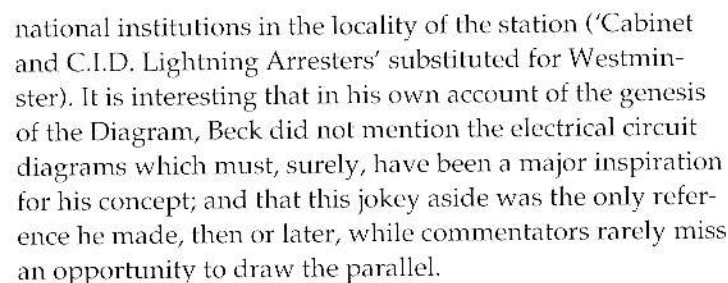
### An electrical allusion

At this point it seems appropriate to refer to a whimsical diversion (17) perpetrated by Beck in the *Train, Omnibus and Tram Staff Magazine* (published as the *T.O.T. Magazine*) for March 1933. In answer to those of his colleagues who ribbed him that he had merely adapted one of the electrical circuits with which he was so familiar in his work, and imposed it on the Underground map, he came up with a version in which station names were replaced by electrical references. The thing was strewn with bad puns ('Bakerlite Tube' for Bakerloo Line, 'Amp' for Hampstead) and sly allusions to





the notice became progressively less prominent in time, the devices used to denote this feature were to absorb the attentions of the designer out of all proportion to its importance (see p 49). The substitution of accurate reproductions of Johnston's 'Underground Railways Sans' typeface (see 14) in place of Beck's more flexible version, while presenting no difficulty on the posters, was to present the designer with endless problems of fitting station names into the limited space available on the card folder format.

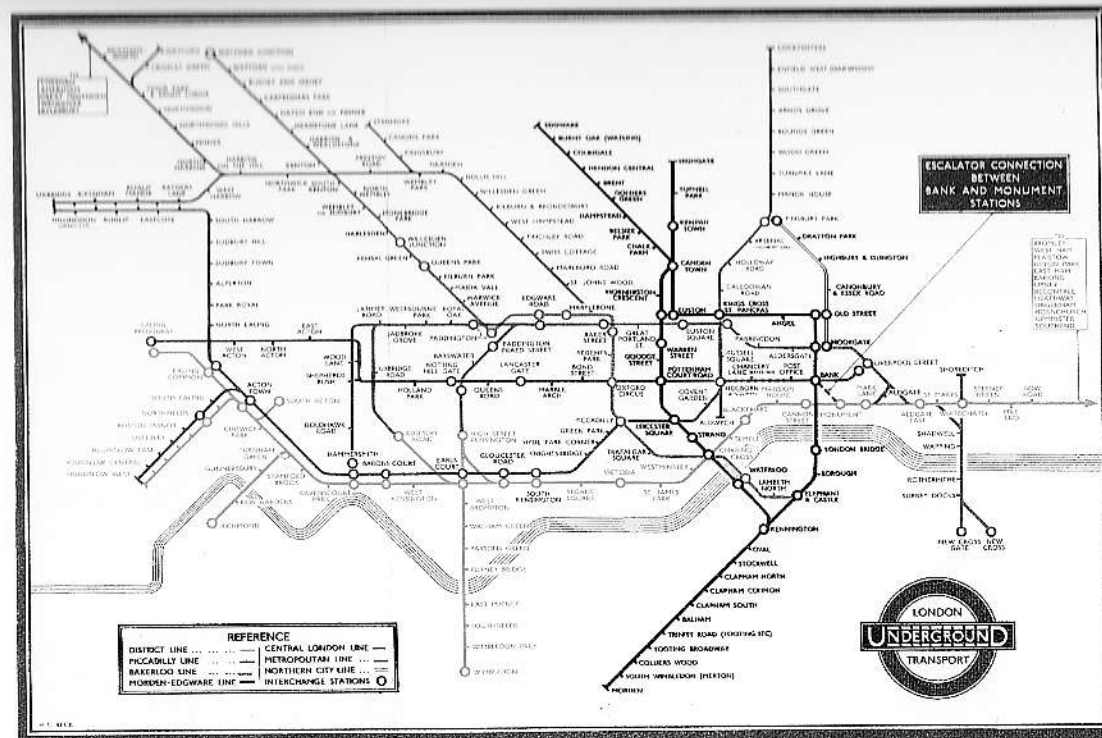


The colour coding of the tube lines was a matter for much discussion at this time. There was a tendency for the public to confuse the orange of the Central London Line with the red of the Bakerloo Line. In addition, Beck realised that the orange was tonally weak, and instead of the Central Line appearing as the strong, horizontal base line he had intended, it was somewhat overpowered by the other lines. By 1934\* the Central became red, with the incidental benefit that the station names were seen much more legibly against the

It may be helpful here to touch upon colour coding and colour discrimination, a subject on which there was only the slimmest literature in the mid-thirties. There was one factor, however, which even a lay person could have observed: that colour discrimination is likely to be less easy when lighting conditions are poor. While the lighting was good inside the stations and on the platforms, it varied greatly in the streets outside the stations, where the Diagram posters were also displayed. As to colour blindness: opticians and physiologists already knew that red-green confusion was not uncommon, especially in men, and that green-blue confusion, though not as common, was not insignificant. But this expert

26

19 Card folder edition No 2 1934. In this design, the problem of confusion between the Central London Line and the Bakerloo Line, caused by their respective colours of orange and red, was resolved by changing the Central London Line to red and the Bakerloo Line to brown: a marked improvement that has been retained ever since. There were other changes: the Piccadilly Line was now shown extending from South Harrow to Uxbridge, running alongside the Metropolitan Line; the East London Line was absorbed into the Metropolitan, the route colour consequently altering from a red outline to purple; and the right-hand curve on the Watford branch line where it joined the Metropolitan's main route to Rickmansworth and Aylesbury was omitted, the westward service from the Watford branch having been discontinued on the last day of 1933. The service returned afterwards but was never shown again on the Diagram



information\*, though available, was not sought by those responsible for devising colour codes (and is quite likely not to be sought, even today). In view of the unscientific, *ad hoc* approach by Beck and his clients, it is noteworthy that, with relatively minor adjustments, the colours of the route lines have remained the same ever since, even to the extent of being able to accommodate two new lines — Victoria and Jubilee — requiring two more colours, and also the more recent identities given to the Hammersmith & City and East London Lines.

### Some 'improvements'

The Diagram was altogether a most tempting object for the management to get their hands on; so they did. Fortunately, all their 'suggestions' for 'improvements', many of which were instructions to incorporate pointless or distracting variations, were, with rare exceptions, implemented through Beck himself. Because of this he never lost control of the essence of the design, and was able to get it back on course

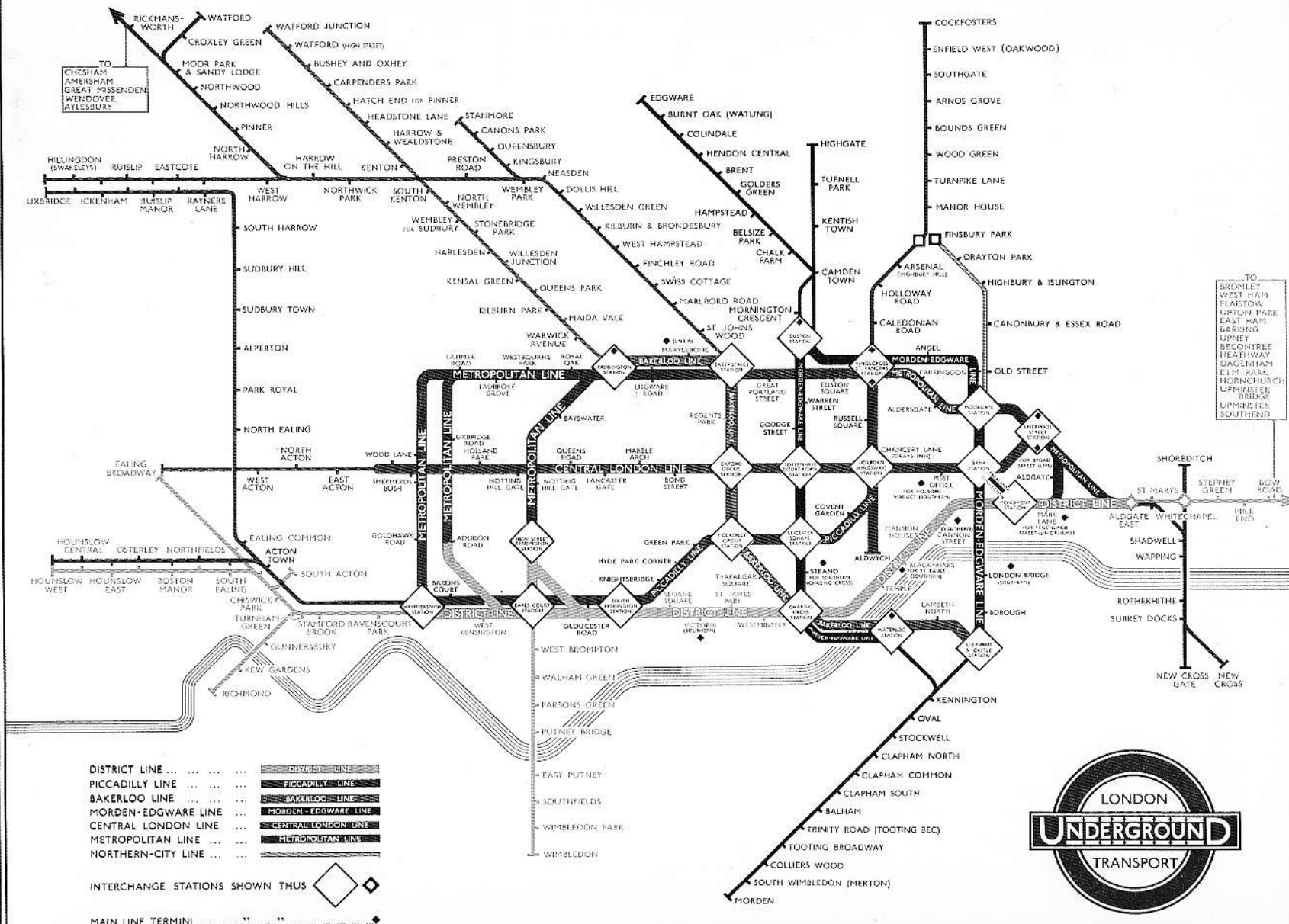
each time the 'improvement' was shown to be not so. In some cases, he recorded, there were:

*... the inevitable ideas for 'improvements' that had to be tactfully repulsed... amongst them was one from Lord Ashfield [Chairman of the LPTB], who wanted to see a central-area diagram with all interchange station names set out in 'bullseye' [that is, bar-and-circle device] panels as they appear on the stations, but the idea rather defeated itself: for legibility, the panels had to be so large that they interfered with continuity.*

Presumably Beck was able to dissuade Ashfield from so harebrained a notion by means of a sketch demonstrating its impracticality†. In other cases, though, he had to go a lot

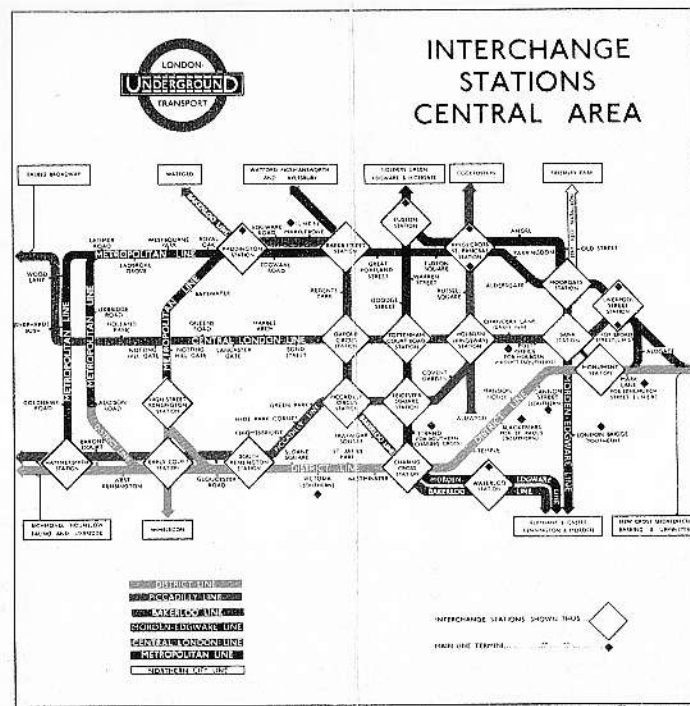
\* For a reasonably up-to-date summary of scientific thinking on colour discrimination and colour blindness, see Gregory, R L, *Eye and Brain*, Weidenfeld & Nicolson, London 1990.

† Ashfield would already have seen one unsatisfactory map of the Underground incorporating such a device: an ingenious concoction designed by A L Gwynne and published in January 1933 (see Appendix A).





20 Quad royal poster of 1935 (left). A most peculiar aberration, incorporating two features imposed on Beck by the Board, which gave Beck a great deal of trouble and no satisfaction at all: the thickening of the lines in the central area so as to include the route names within them in white; and the use of large, white diamonds for the central interchanges with the station names inside them – and not only the names but also the word 'Station' and, for the main line termini, a little black diamond as well. Thus the central area, cluttered with thickened lines and outsized diamonds, was imposed on an otherwise virtually unchanged Diagram. Beck undertook the line thickening with little enthusiasm; the outsized diamonds were anathema to him. He remembered thinking at the time that such a bizarre notion could not survive more than one edition. Alas, it was not so. The colour coding on this edition was also a matter for some concern. Unaccountably, the colour of the Metropolitan Line was changed from purple to a deep red hardly distinguishable from the vermillion of the Central London Line. This proved so obviously unsatisfactory that it would be promptly changed; but not entirely for the better.

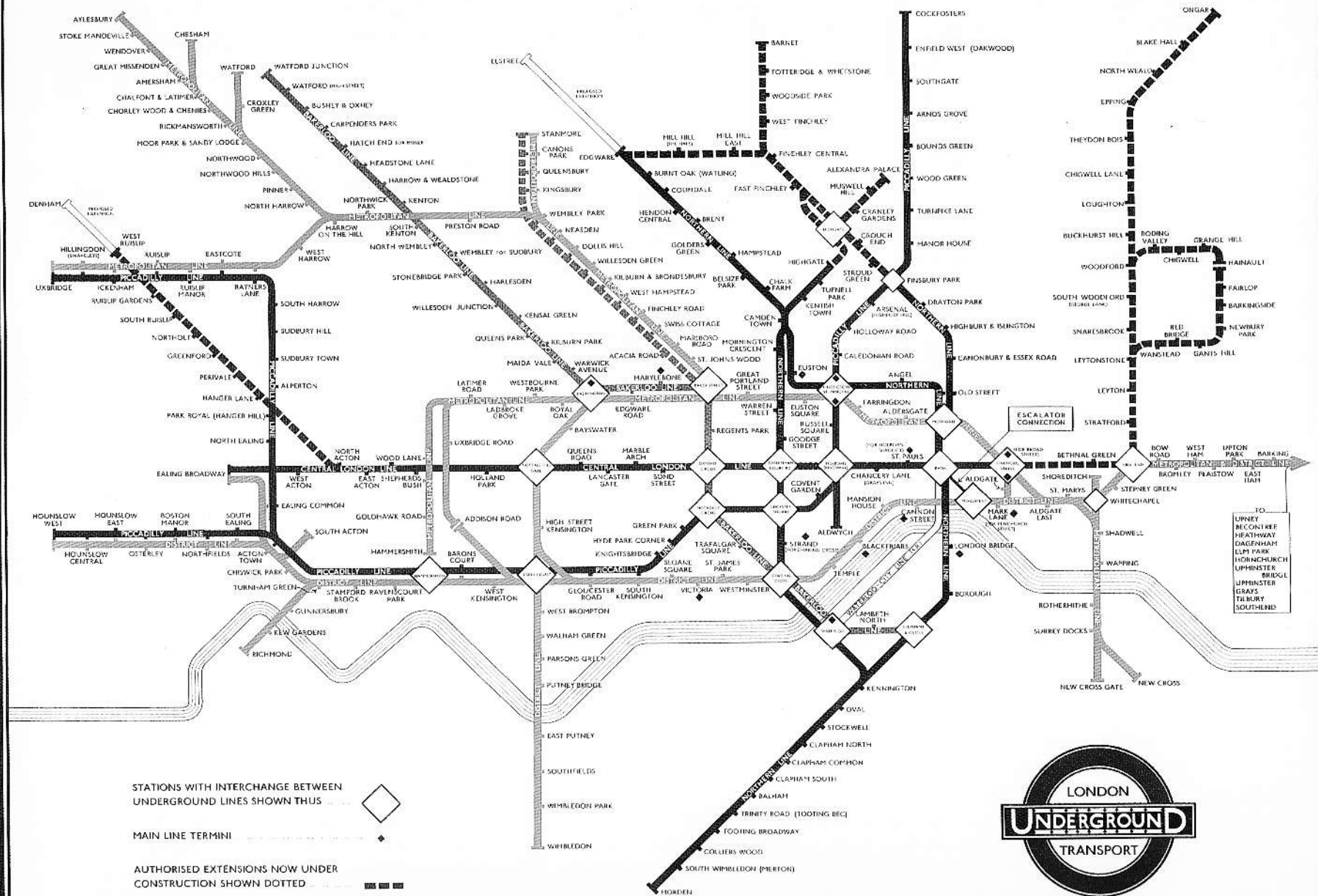


21 Reverse of a 1935 card folder edition of the Diagram, containing a representation of the central area of the network with the interchange station names inside large diamonds, as on the quad royal poster of the same year (the smaller scale preventing its incorporation on the Diagram proper).

further than that. In 1935 (20) the use of diamonds for the interchange stations was revived, but in a particularly dire form: 20 of the most central interchanges were denoted by large outline diamonds with the names of the stations printed inside them: an absolute nonsense, since the lettering had to be so small, in order to accommodate such names as Tottenham Court Road Station (yes, they even insisted that the word 'station' be included as well!) that it was appreciably smaller than the lettering of all other stations. Beck totally disapproved of the idea but he loyally incorporated it in the new quad royal poster. On this same design:

*I was told to thicken the route lines so that the name of each, e.g. Northern Line, could appear in white capitals within its thickness.*

These two features — the outsized diamonds and the thickened route lines — had the effect of altering the Diagram markedly for the worse. Beck hoped this version would be seen right away for the aberration it was; but he was compelled to put up with outsized diamonds until 1937, by which year the thickened route lines had been extended over the whole Diagram (22) — though not so thick as in the 1935 version.



For obvious reasons of scale, the device of enlarged diamonds with station names inside them was not used on the overall Diagram in the card folder editions, but it was employed, with fair success, in the accompanying representation of the central area on the reverse of the folder (21). Though this use of the device was discontinued when it was abandoned on quad royal editions, it reappeared in similar form on card folders between 1949 and 1954, with the diamonds replaced by rings.

A second quad royal of 1937 disposed of the mistaken concept of putting the station name inside the diamonds, allowing Beck to reduce the latter in size — though they remained prominent — and to restore the names themselves to the same size as all the other stations.

Two quad royal versions of 1937 were required to display information which transformed them from their predecessors; they included for the first time a proposed, vast extension of the Central London Line, to the east and northeast as far as Ongar, and to the northwest as far as Ruislip (or

Denham in the case of the smaller-diamond version). Shown in broken lines, the extensions were described in the attached keys as 'authorised extensions'. The two branches designated to terminate at Hainault, one via Redbridge (at that time spelt Red Bridge), the other via Chigwell, formed a virtual loop: a feature quite unlike any other on the Diagram so far, and one that provided a welcome touch of the unexpected in the top right hand corner of the design.

As to thickening the route lines in order to insert the route names in white within them, this was dropped in the late 1930s, but then revived from 1946 until Beck's last design in 1959. Though he was not happy with it the first time round he appears to have returned to it with rather more equanimity.

### A profitless experiment

The proposed extension of the Central London Line (renamed the Central Line in late 1937) to east and west was one of the factors that led Beck to undertake a vast speculative work (see Appendix B):

*In 1938... I spent a long time building up a comprehensive diagram of the whole rail system of Greater London... this colossal piece of homework earned me nothing: I was told there was too much on it.*

One is tempted to ask why, on the evidence of the first edition of the Diagram in 1933 — received with such unexpected delight by the travelling public — London Transport could not bring itself at least to issue a trial printing of this experimental design. It is possible the public might have agreed with the management of LT that 'there was too much on it' for their liking; they were never given the chance to find out\*. But even if LT was justified in not giving the comprehensive diagram wide publication, could it not have printed a limited edition for internal use? After all, this was a unique visualisation of what was probably the most intricate pattern of rail connections in the world. Even if it was 'too much' for the public, it was surely not too much for the experts?

\* Until 1973, that is, when the 'London's Railways' diagram appeared (see Appendix L).

22 Quad royal poster of 1937. The thickened lines, first seen in the 1935 poster, were still in evidence, though somewhat less thick and now extended over the whole Diagram. The diamonds, too, were still there, though reduced in size and no longer burdened with the redundant word 'Station' inside them. The Metropolitan Line was no longer coloured deep red, so avoiding the confusion present in the 1935 poster, but had become a green identical with the District Line. No doubt there was some internal logic that had governed this, possibly connected with ideas that were being discussed at the time for greater interworking between the two 'surface' lines. But to the outside observer — and most particularly in the eyes of the ordinary traveller — it was surely puzzling: why were two otherwise distinct Underground lines now sharing a common route colour? But puzzling or not, this coding scheme was to persist until 1949, when the

Metropolitan Line reverted to its previous purple identification. Another, less puzzling, change in colour was that the station names, until then in self-colours (that is, in the same colours as the route lines themselves) were now all in black. It had the effect of changing the balance of weight between the route lines and the lettering, not for the better, and removed a most distinctive feature of the Diagram. On the other hand, it went some way to overcoming an imbalance whereby the Northern Line had appeared doubly dominant — having a black route line and black lettering in contrast to, say, the green of the District Line and did away with the need to repeat station names where more than one line was involved. With this edition of the Diagram, Beck was charged with a new requirement of introducing the proposals of the 'New Works Programme 1935-40' which had been announced by London Transport in June 1935. He had to show a com-

plex of northward extensions of the Northern Line and two lengthy extensions eastward and westward on the Central London Line (soon to be renamed the Central Line). The inclusion of the proposed extensions (by broken lines) constituted one of the greatest challenges to Beck as designer. It was a matter of no small regret to him that he was tackling it at the same time as he was compelled to deal with the footling nonsense of the outsized diamond interchange symbols. But at least, in this case as in all editions of the Diagram since its inception, he was the responsible designer; the following year was to offer a quite different challenge, this time to his own stewardship.